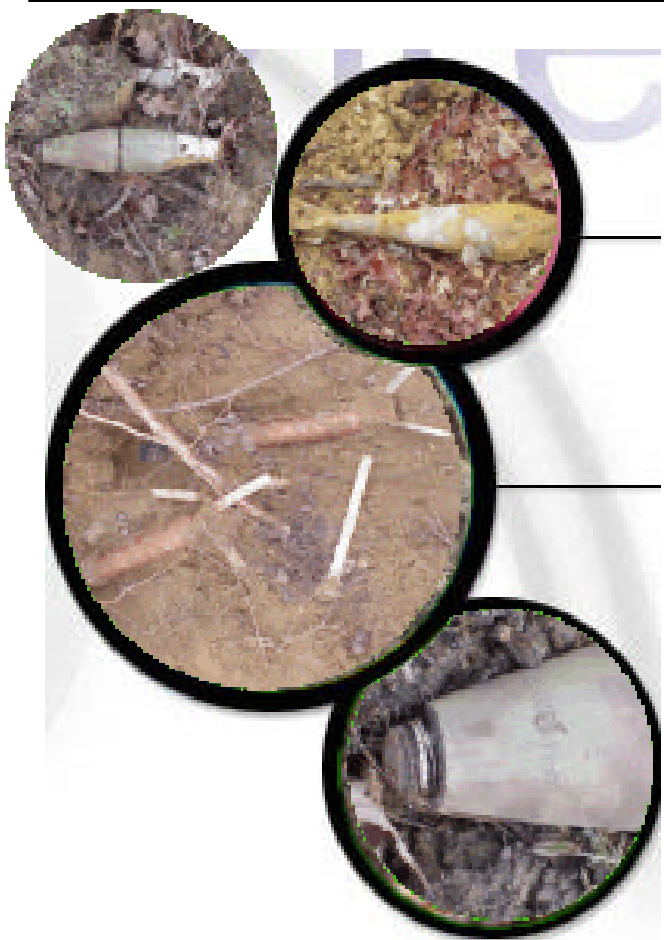


Army Worldwide Environmental & Energy Conference 5-7 Dec 2000

**UXO & Munitions Regulation on
Active Ranges**

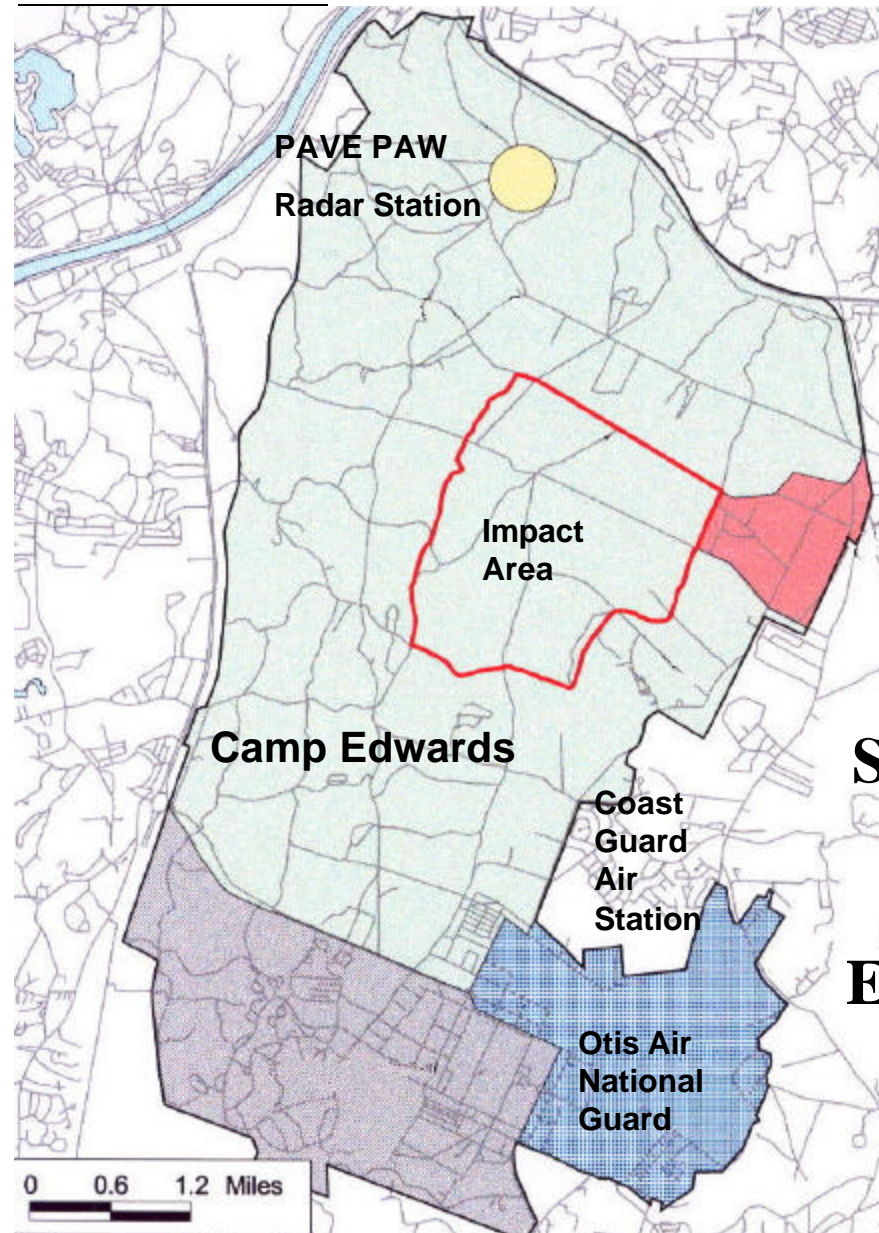
**Massachusetts Military
Reservation (MMR)
Groundwater Study Update**

**Colonel Richard O. Murphy
Chief, Environmental Programs
Army National Guard Bureau**



MMR

Location Cape Cod, MA



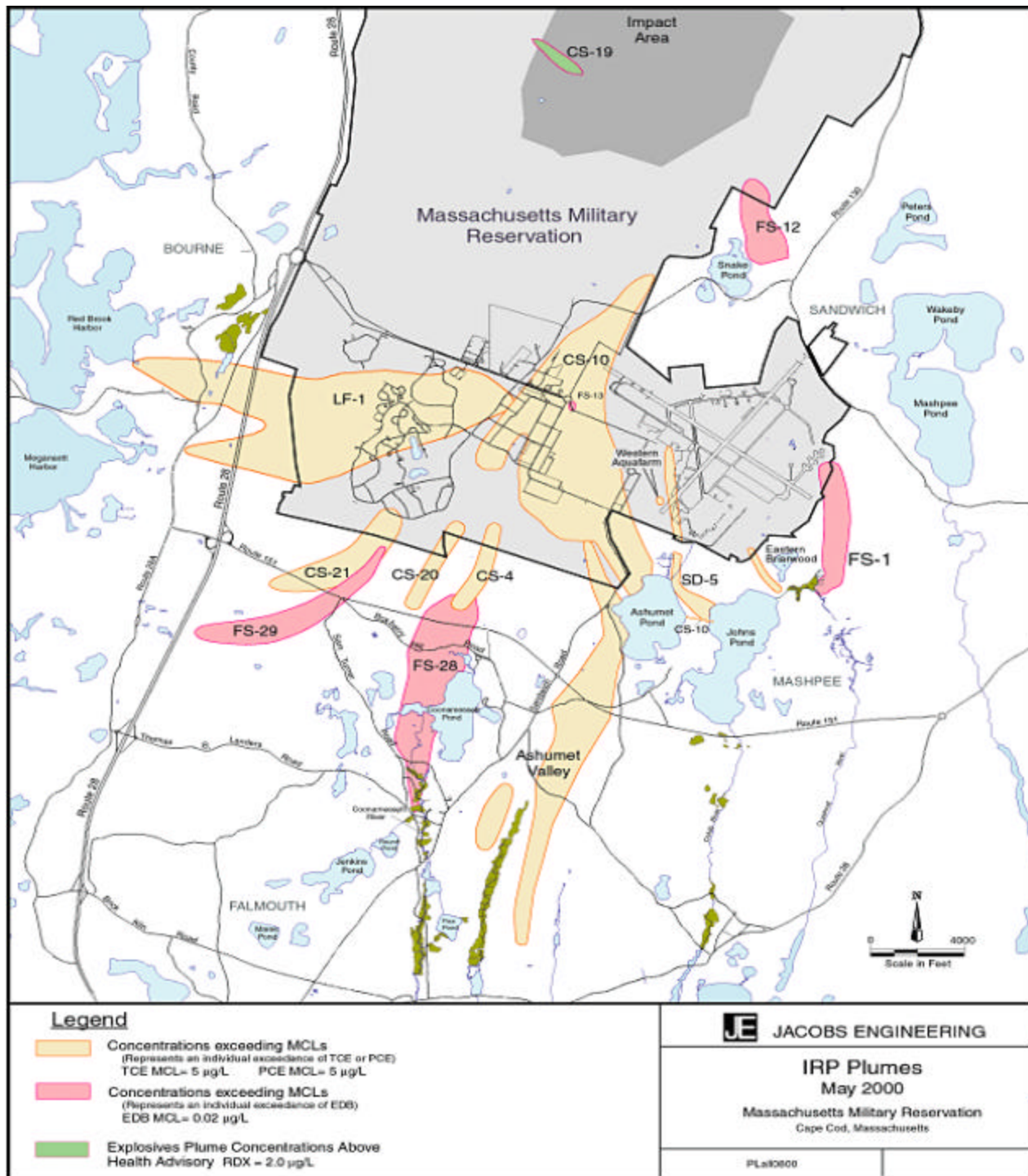
- MA ARNG (Camp Edwards)
- MA ANG (Otis ANG Base)
- United States Coast Guard Air Station
- 6th Space Warning Squadron (PAVE PAWS)

Size: Approx. 22,000 Acres

- Training Area: 14,000 acres
- Impact Area: 2,200 acres

Established: 1911

- State-owned Land
- Leased to the Federal Government
- Licensed to MAARNG



Otis ANG Base at the southern end of MMR has been an EPA Superfund site since 1989. 12 Major plumes reportedly have contaminated 6 billions gallons of drinking water with TCE, PCE, EDB and Benzene. Drinking water supplies in four adjacent towns have been affected. DoD has connected hundreds of private homes to public drinking water. To date the Army (40%) and Air Force (60%) have spent \$396 million at Otis. Final cost may reach \$1 billion. Public outrage was high and is still evident but has improved significantly through an active community involvement program by the Air Force Center for Environmental Excellence (AFCEE). DUSD-ES has promised 3 million gallons of water a day from new wells on MMR.

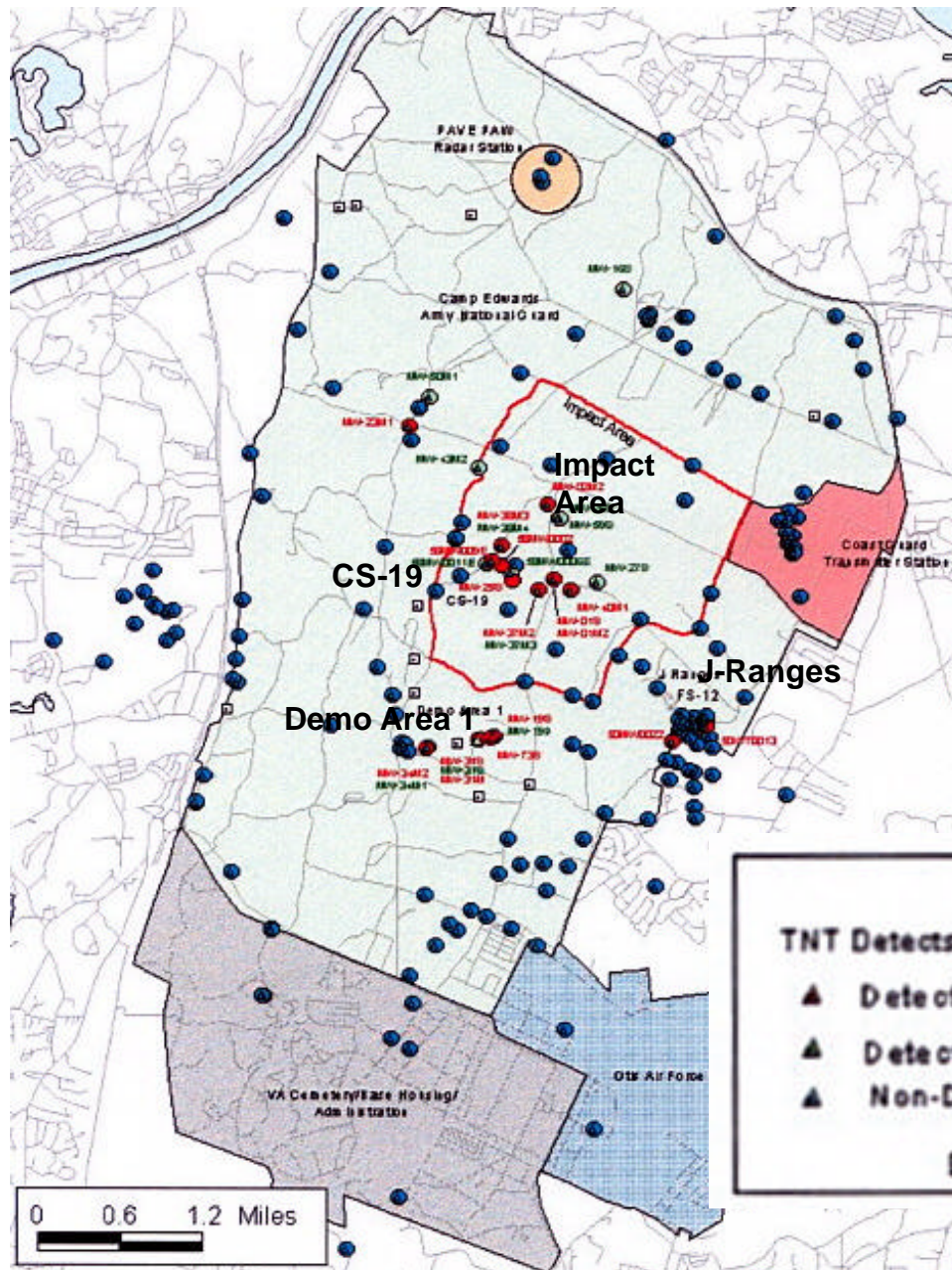
Administrative Orders

- AO #1 (Feb/97):
 - Conduct Groundwater Study
 - Conduct Munitions Survey
- AO #2 (Apr/97):
 - Cease Fire Order

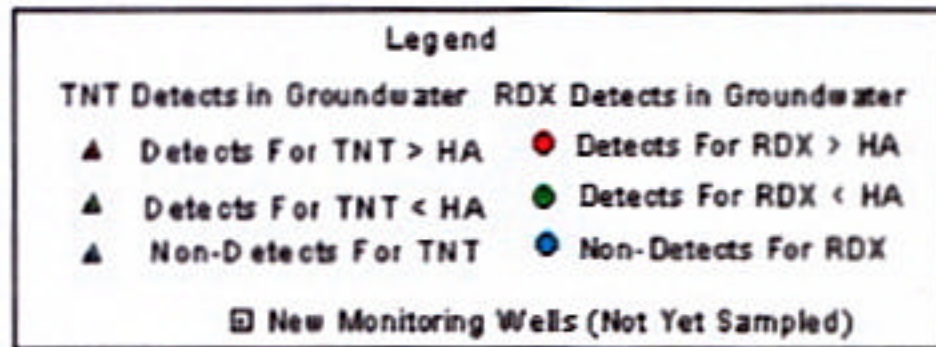
Prohibited use of Propellants, Pyrotechnics, High Explosives, Lead Ammunition and required removal of lead from 16 small arms range berms. (stopped training with artillery, mortars, smoke and signal smokes and small arms with lead ball ammunition, and engineer explosives training).

- AO #3 (Jan/00):
 - Cleanup of Soil & Groundwater Contamination

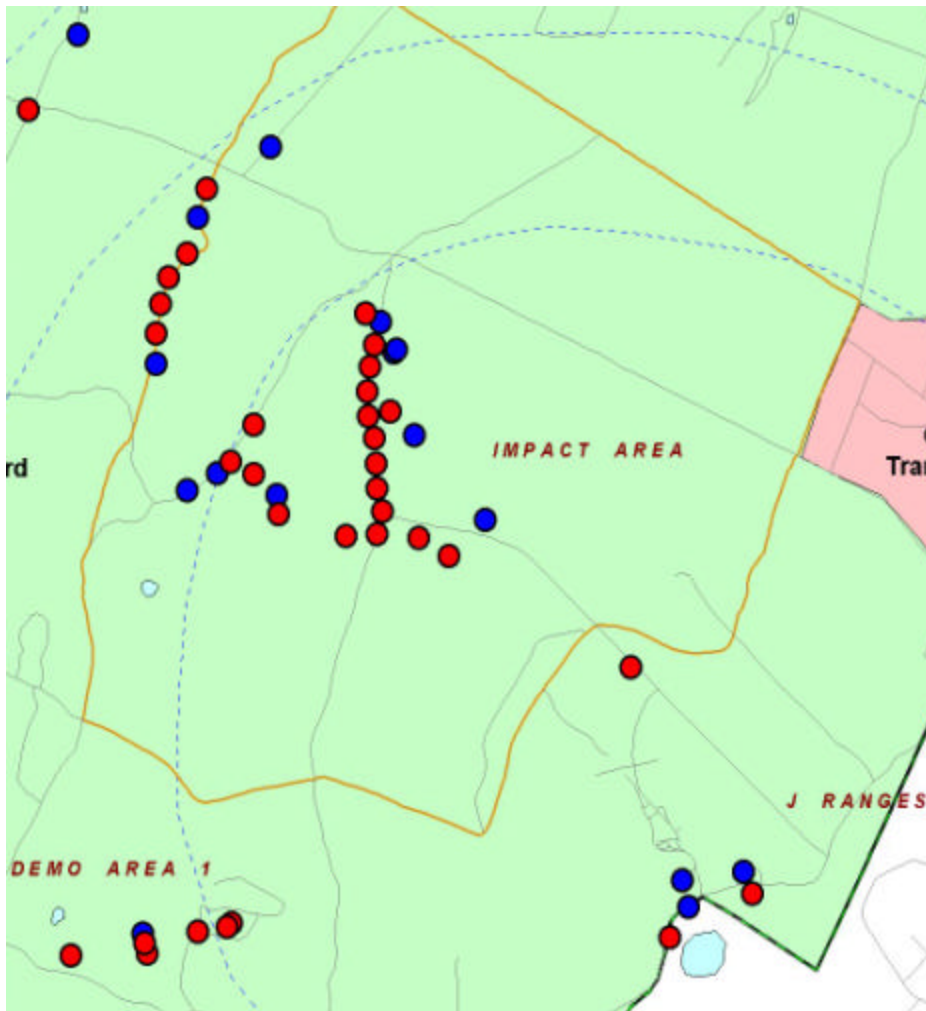
IAGWS Sampling Results To Date



- **Explosives in Groundwater**
 - Demolition Area #1
 - South of J-Ranges
 - CS-19 (Restoration Program)
 - Impact Area
- **Explosives in Soil**
 - RDX and Nitroglycerine at KD Range
 - Demolition Area #1
 - UXO Open Detonation Areas
 - Target Areas

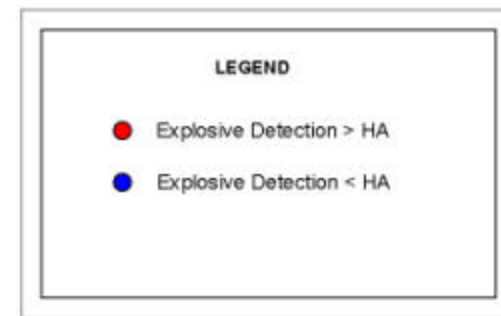


Explosives Contamination: Locations in Groundwater

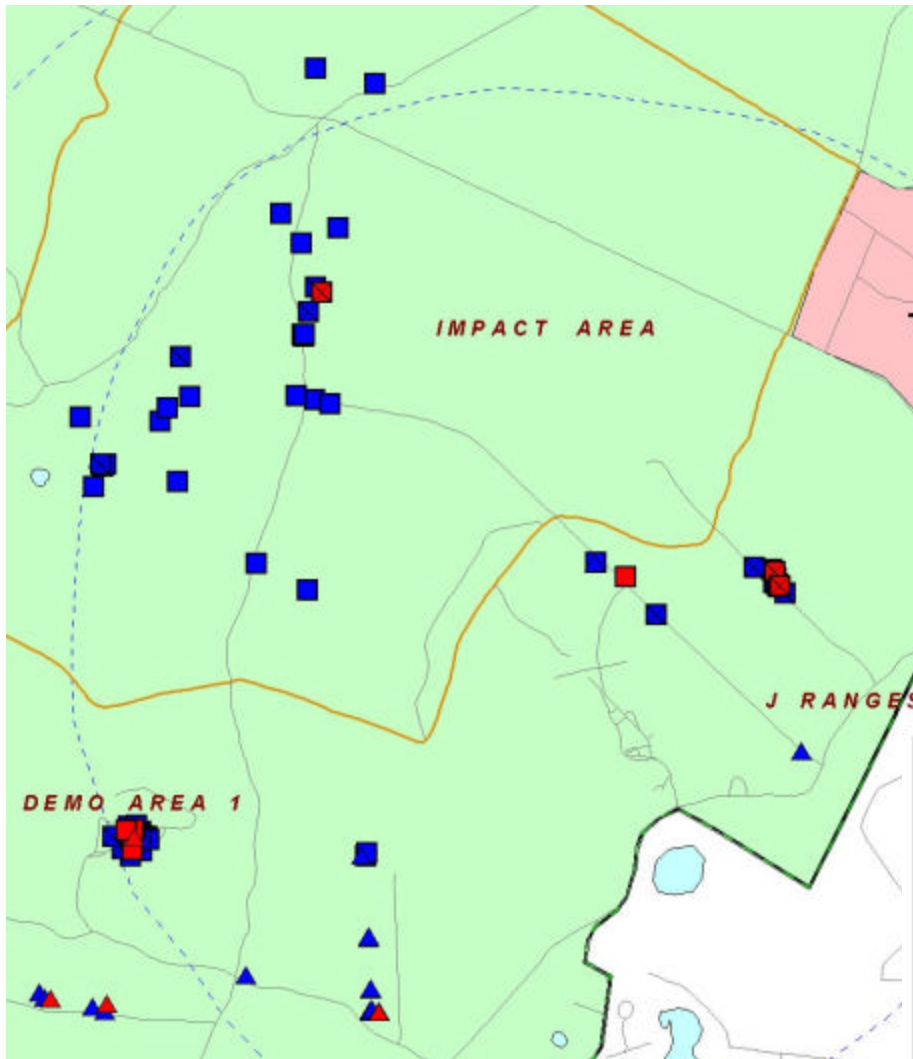


Explosives in Groundwater

- Demolition Area #1
- South of J-Ranges
- Impact Area



Explosives/Propellant Contamination: Locations in Soils

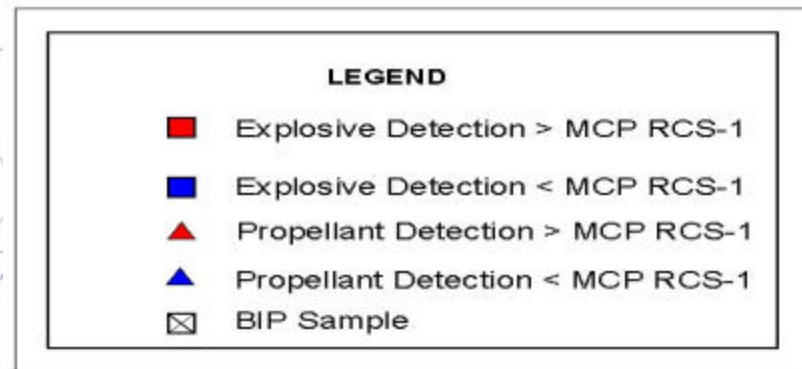


Explosives in Soil

- RDX and Nitroglycerine at KD Range
- Demolition Area #1
- UXO Open Detonation Areas
- Target Areas

Propellants in Soil

- Gun Positions
- KD Rocket Range



What We Know

- Explosive contaminants:
 - not detected in any drinking water wells
 - in soils above State Reportable Levels
 - in groundwater above Health Advisory Levels
- Propellant contaminants:
 - in the soils above State Reportable Levels
- This contamination is the result of military activity
- EPA Position: Army Training & Unexploded Ordnance (UXO) have caused the contamination.

Possible Sources of Explosive Contaminants

- Disposal
 - Burial of Munitions
 - Open Burn/Open Detonation
- Past use of HE Artillery & Mortar
- Unexploded Ordnance (UXO)
 - Low-Order Detonations/Corrosion
- Defense Contractor Operations

Current Activities

- Range Berm Lead Removal completed 1999
- Executing Requirements of EPA Cleanup Order
- J-Range Investigations
- Transition to Corps of Engineers as Supervising Contractor
- Munitions Survey/Excavation of Target Areas
- Execution of Supplemental Archive Search Report

EPA Cleanup Order

(Administrative Order #3)

Current Status

- Completed removal of soil contamination at six sites before 30 Sep 00 deadline.
- EPA requirements for soil removal at three additional locations (November 00)
- Negotiating Feasibility Studies (FS) w/EPA, including for Unexploded Ordnance (UXO).

J-Range Investigations

- EPA Approved Investigations Started - \$6M
- Textron Services Corporation (TSC)
 - NGB Proposed Cost-Sharing Agreement
 - TSC Feels Costs are Excessive
 - No agreement reached, continuing to talk
- DA Environmental Law Division has lead, NGB-JA supporting

Army Corps of Engineers

- Transition to Supervising Contractor
 - Began 1 Aug 00
 - Complete NLT 1 Jan 01
- Key Benefits to the Groundwater Study Program:
 - Technical Expertise (Including UXO Removal)
 - Investigation/Remediation Experience Worldwide
 - Established Working Relationship w/EPA
 - Can evaluate MMR lessons learned for “Total Army”

Munitions Survey

(Phase 1)

- Geophysical Survey of
 - Gun & Mortar Firing Positions
 - Water Bodies & Slit Trench
 - Defense Contractor Areas (J-Ranges)
 - Demolition Area #1
- Excavation of Two High-Use Target Areas

Supplemental Archive Search

- Dual-Purpose:
 - Assist in Identifying Sites for Investigation
 - Address Public & EPA Concerns
- Team Includes:
 - Corps of Engineer's Archivists
 - Contracts Lawyer Team
 - Military Historian
 - Private Investigator
- Community/Regulators want answers to UXO, Testing, DU, Chemical (Chemical Test Kits) and disposal activities in the past.

Innovative Technologies

- Contained Detonation Chamber
- Soil Washing/Bioremediation
- Cesium Vapor/EM Magnetometer
- Munitions Survey Aerial Platforms
- Innovative Technologies Evaluation Team



The Future of Investigations & Cleanup at MMR

- **Expanded Cleanup/Increased Costs**
 - New requirements under SDWA impact current year funding (FY01 UFR is now \$16M+)
 - Expanded Community Involvement Efforts
- **Cleanup Requirements**
 - Cleanup of Explosives in Groundwater & Soils under Safe Drinking Water Act (SDWA)
 - AO #3; May require removal of all UXO
 - Requirements under SDWA are not the same as CERCLA risk-based requirements
- **MMR as the Laboratory/Innovative Technology Center for the Army**

QUESTIONS?

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